Southeast Alaska Cloudburst Chronicle

Vol. III, No. 1
Winter 2003

National Weather Service
Juneau, Alaska

A Quarterly Publication

In This Issue:

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Comments concerning this publication or questions about the National Weather Service can be directed to us. Contact us at:

National Weather Service
8500 Mendenhall Loop Rd.
Juneau, AK 99801
(907)790-6800
Chris.Maier@noaa.gov

To view our newsletter in color, please visit our website at:
http://pajk.arh.noaa.gov

Editors: Chris Maier & Ursula Jones

Juneau Forecast Office Welcomes New Meteorologist In Charge!

Tom Ainsworth was selected to replace Laura Furgione at the National Weather Service Office in Juneau. Tom arrived for duty November 25, 2002 after transferring from NWS Western Region Headquarters in Salt Lake City, Utah.

Tom obtained his Bachelor degree in Meteorology from St. Louis (Missouri) University. He began his career at the NWS Forecast Office in Seattle as an intern in 1983. In 1987, he transferred to Weather Service Office Redding, California, as a fire weather forecaster and in 1989, was promoted to the Portland, Oregon, office as a forecaster and NWS warning program leader for Oregon. He and his wife Suzanne have three sons.

Tom is originally from Oswego, New York, on the shore of Lake Ontario, an area famous for heavy "lake effect snows." Tom credits some fantastic snow events he experienced growing up for influencing his decision to become a meteorologist. "I distinctly remember one lake effect storm that produced 103 inches of snow over one weekend. I was six years old and of course the schools were closed. My two older brothers and I put on our snow clothes, went out an upstairs bedroom window on to the porch roof, and slid down the snow pile to the front yard. I was expecting a day of fun in the snow. Instead, my father, who was standing at the bottom of the slide, handed each of us a shovel to help him locate and dig out the front and back doors to the house."

Tom's responsibilities in Salt Lake City focused on ensuring NWS warning and forecast services were included in community emergency preparedness activities in eight western states. Tom is a strong proponent of community outreach and education to both emergency responders and the general public. "Weather impacts our lives and livelihoods in many ways. Ideally, the weather information from the Juneau forecast office will help others help themselves." Through close working relationships with local governments, the general public, aviators, mariners, and outdoor enthusiasts, Tom believes individuals will be better able to interpret weather information available to them and apply it in

New MIC Tom Ainsworth

continued from cover...

ways that will best meet their various individual needs. An example of Tom's outreach philosophy include a training workshop he developed in partnership with the Navy that brought together west coast marine weather forecasters, commercial fishermen, and research meteorologists to understand each party's capabilities and limitations pertaining to the safety of life at sea. As a result of this dialogue, significant changes were made to the format and content of marine weather information NWS made available along the west coast. The popularity of the workshop has made it an annual event.

Tom is investigating creative and effective ways to visit with citizens, emergency responders, and the news media throughout Southeast Alaska and learn more about their needs for weather information. Starting in the early 1990s, NWS made a commitment to providing its workforce with new technologies in weather detection, analysis, and prediction. These new technologies will ultimately lead to a clearer understanding by our customers of the weather information we provide. This winter, the Juneau forecast staff has been aggressively training and implementing new equipment and procedures for generating weather information graphically. The graphic forecasts will complement traditional text based information. In mid February, weather offices in Metlakatla and Yakutat will begin training on a new system as well. Through town hall like meetings and demonstrations, Tom and his staff will show these new tools to the public later this year. "Our goal is to allow our valued customers - the actual users of our weather information in Southeast Alaska - to provide input on how we can best present our information. We won't be able to do everything we get asked to do, but through our outreach efforts with everyone, I'm confident we will hear many great ideas that we wouldn't have thought of ourselves. For our 'weather services' to be effective, we need to make sure our forecast information is presented in ways that allow people to interpret it quickly and correctly. We're hoping our new graphical presentations of weather information on the web will be a significant improvement in achieving that goal!" ❄

Latest News On IFPS

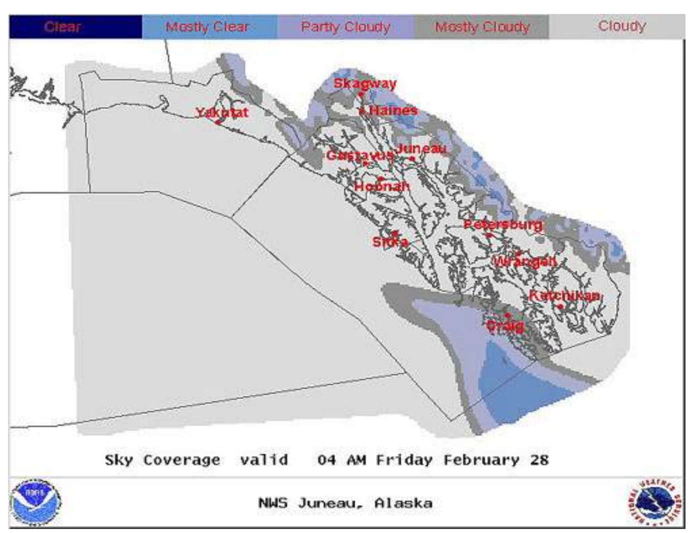
by Brian Bezenek

In the last newsletter, I presented some information on the NWS's implementation of the Integrated Forecast Preparation System (IFPS). In this article, I thought I would bring everyone up to date on how things are progressing, here at WFO Juneau.

I had mentioned that we had plans on having graphical forecasts available on the web for everyone to view by spring. In mid January, we began by putting out the temperature forecasts, and at the end of February we've added sky cover. We broke the sky cover up into the five categories we use in our products: cloudy, mostly cloudy, partly cloudy, mostly clear, and clear. Please take a look at this new way for us to present you with forecast information. These graphical forecasts are available on our website at: **http://pajk.arh.noaa.gov/fcstgrids.php** (or under the "Graphic Forecasts" link on our Home page.)

Over the next several months we will continue to add more graphical forecast products to our web page. Look for Probability of Precipitation (POP) by the end of March, Weather (rain, snow, fog, etc...) grids by the end of April, and Wind and Seas by the end of May.

We (the forecasters) would also like to know if you have any comments, questions or suggestions regarding our graphical forecasts. Please send me an e-mail at **brian.bezenek@noaa.gov** and I'll do my best to answer questions or solve problems you've noticed. I will even try to include the questions and comment into my next newsletter article on IFPS and how things are shaping up! ❄



An example of our new graphical forecasts of "sky coverage." We are hoping that all of our graphical forecasts will help you visualize our forecasts and provide a much better service.

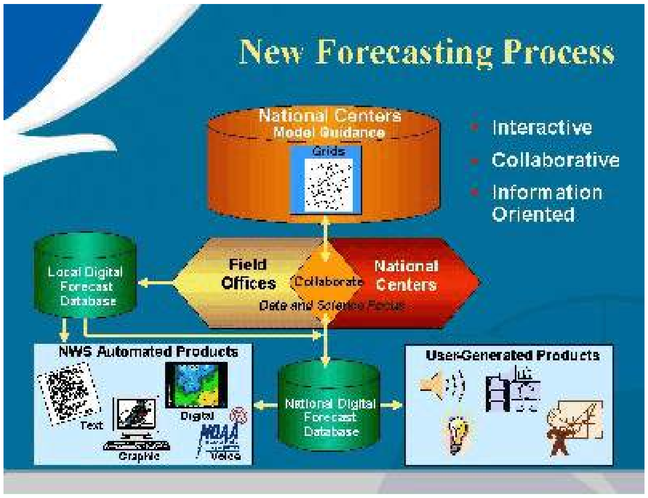
Why IFPS???

by Chris Maier

You might have heard a little bit about this new technology known as “IFPS” that the National Weather Service (NWS) is implementing this year. You might have even noticed the new “experimental graphical forecasts” on our web site. So what exactly is this all about? Hopefully here we will begin to shed a little more light on how IFPS and something known as the National Digital Forecast Database (NDFD) are going to provide you, our customers and partners, with innovative ways of utilizing our forecast services. Much of the following information can be found on the NDFD homepage: http://www.nws.noaa.gov/ndfd/index.htm

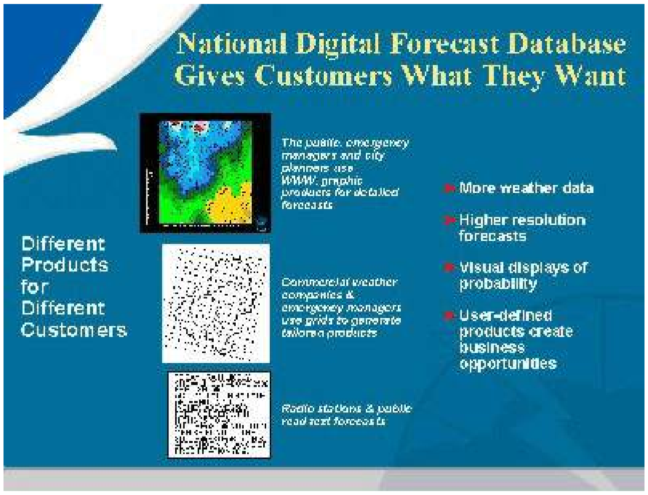
Many technological advances and scientific breakthroughs have allowed NWS weather forecasts and warnings to become much more specific and accurate. However, the production and dissemination of routine NWS forecasts must keep pace with the need for such information in this digital age. A primary means of providing sensible weather element forecasts (e.g., cloud cover, maximum temperatures, winds) from NWS Weather Forecast Offices (WFO) is still in text format.

The new Interactive Forecast Preparation System (IFPS) is being implemented not only for the preparation of these familiar text and voiced products, but also to create digital (i.e., numerical) and graphical products. This digital and graphical data will be produced at each Forecast Office in the United States. This data is then compiled into a National Digital Forecast Database. The real power of a digital database is that it opens the door for providing much more forecast information and in more useful forms. The NDFD will contain much more data than the NWS was previously able to provide, at time scales as small as hourly and space scales of a few kilometers.



The benefits of a digital forecast database are extensive. Partners in the production and dissemination of weather forecast products should find the NDFD a gold mine of information. It will be up to date, with the exception of time-critical warnings that are disseminated within seconds by other means, and will be national in scope. It will eventually contain essentially all the basic information from which forecasts are produced by the NWS.

Some potential uses and benefits we can envision for our customers and partners are as follows:
*decision support systems that fit the forecast to the problem
*graphics for mass media
*weather information along a path -- forecasts for a drive across country with projections matched to user itinerary
*forecasts for vehicles and hand-held devices with Global Positioning Systems
*controls for smart appliances (e.g., heating, irrigation)
*text generation in more than one language



Teaming the NDFD with GIS systems will provide very powerful capabilities. The NDFD will give customers the weather information they want, when they need it, no matter where they are! Commercial products available today that provide point forecasts or large scale graphics sometimes rely on direct model output or the algorithmic interpretation of model output (e.g., MOS). The NDFD will be the source of more accurate official NWS forecasts produced by actual forecasters; previously such digital forecasts were not available. The ultimate benefit for everyone will be that you will be able to decide for yourself how you want to receive our forecasts! Graphics? Digital? Text? Some combination? Any individual user with a computer and access to the internet will be able to download information from the NDFD to suit his or her needs. Customers will no longer have to wait for the timed broadcast of weather information. You will be able to receive the specific information needed based on your schedule. We will continue to try and provide more specific details in the coming months on how you will be able to take advantage of this new technological way that your National Weather Service will be providing service.

Cloudburst Classroom

Pressure: We're all under it!

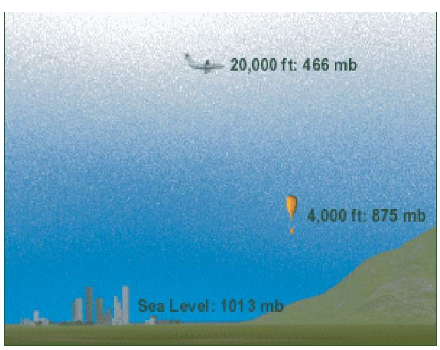
by Kimberly Vaughan

Atmospheric pressure, most folks don't really think about it until their knee starts to hurt or their ears pop when they fly. What is pressure? How does it affect us? How do we measure it? There are so many questions and answers to be answered on pressure, we simply can't cover it all here. We'll just focus on the really cool stuff!

So, what is it? Air is composed of many molecules (mostly oxygen and nitrogen). These air molecules each have a mass and as Sir Isaac Newton figured out, if its got mass, gravity pulls on it. Picture a column of our atmosphere directly over your head. The air molecules in that column exert a pressure (weight) downward on your head. Basically, the less air molecules in that column, the lower the pressure and vice versa. The ocean, another fluid, acts in the same manner! So, when you go up in elevation on our planet, there is less air. The column over your head is naturally smaller in height, contains less air molecules and therefore exerts less pressure.

That is not the only way air gets 'heavy.' Temperature and humidity also play a big part in all this. If air is heated, the molecules speed up and collide into each other more often. This causes warmer air to expand and become less dense. If air is cooled, it becomes more dense. Similarly, if the humidity of air increases, the water molecules make the air more dense (and vice versa). For pilots and climbers or anyone else trying to reach heights well above sea level, this is a major issue. It affects how a plane performs and how well a living being can breath.

The atmosphere around the earth is not a perfect distance all the way around it's spherical surface. As the earth spins it causes the atmosphere to be thinner at the poles and bulge at the equator. So what's the big deal? That should just mean the tropics are under a lot more pressure than us Alaskans, right? That is true, but the drawback to that is a person that could climb to the top of Mt. Everest without the aid of oxygen could not have done so if the mountain was located closer to the poles (higher latitudes).



So why else do we care about pressure so much care? Us weather forecasting types care an awful lot about pressure! On a large generic scale high pressure means good weather and low pressure means bad weather. As most of us know in Southeast Alaska this is NOT a good rule of thumb. I've spoken with many of the mariners that operate in Alaskan waters and they have taken that generality and made it into a good rule of thumb: *"increasing pressure means better weather than is currently occurring, and if the pressure is decreasing, the weather will be getting worse than it is."*
Another major impact pressure has on our weather is how it causes wind. We'll save the major details for our next Cloudburst Classroom, but differences in pressure are what move air, or in other words, create wind!

Now let's talk about how we measure pressure. Before we go straight into the equipment why not know about the men that figured out what air pressure was and its effects. There are over a dozen people who conducted experiments on pressure and many made great discoveries...a few were not so correct as we later found out. It started in 1618 when Issac Beekman compared air to water, and the pressure that water exerted at different depths. In 1640 Gaspar Berti showed how an air vacuum could be created using a lead tube and a bucket of water. Three short years later Evangelista Torricelli conducts Berti's experiment using mercury in place of water. This was the launch pad for the invention of the barometer. In 1660, Robert Boyle was the first person to use a barometer to try and predict the weather.

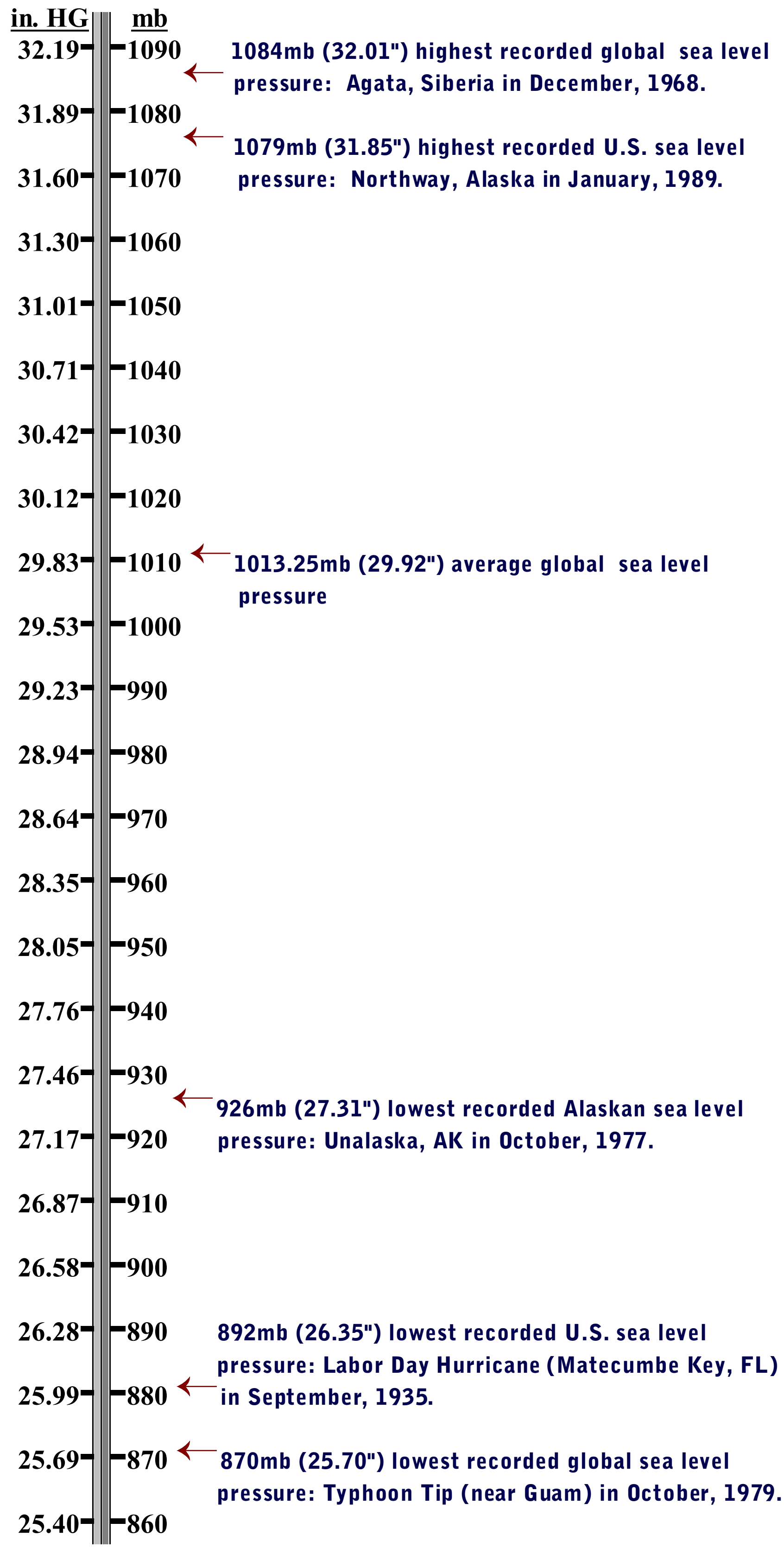
Skipping ahead about 400 years we come to the present day where the barometer has gone digital, but still works based on the same principles. Pressure is exerted on something, either a fluid such as mercury or a diaphragm, and the amount of pressure is measured electronically by the mercury level or needle placement. Even though digital barometers are replacing many of the aneroid barometers, the older units are still very pressure - continued

reliable. The digital units vary in size from about a 4 x 6 x 4 inch box to larger units about the size of a large bread box. These units require a power source, where as the aneroid barometer requires none. The aneroid barometer is a cylinder about 4 inches thick with a diameter around 8 inches. It has a glass face you tap to settle the needle on the current pressure. The needle inside is designed so the tip moves over a mirrored ring allowing for the viewer to get a more accurate reading. Mercurial barometers are also still used, but have been fazed out of many places due to the hazardous properties of mercury! Both the electronic and aneroid units can be carried out to the field and used remotely.

Pressure is normally measured in Millibars and Hectopascals (also referred to as inches of mercury). The average atmospheric pressure at sea level is 1013.25 mb (millibars) or 29.92 inches of mercury. On page 6 is a conversion chart that helps show how the pressure scales are related. This table covers the range of pressure that we have historically experienced in Alaska. This pressure conversion table might be a useful reference for Mariners. Feel free to laminate it to make it waterproof.

So, with 10 to 20 tons of air molecules above us every moment pushing 15 pounds per square inch of force down on us....***we really are under a lot of pressure!***

Pretty cool stuff: We talked about temperature in the last issue and there is a connection between temperature and pressure. At sea level water boils at 212 degrees. As one increases in elevation and the pressure decreases the boiling point also decreases. Water will boil at only 40 degrees at 100,000 feet!



NOTE: Within tornados even lower pressures exist, but to date no one has been successful in measuring it.

PRESSURE CONVERSION TABLE (MILLIBARS TO INCHES OF MERCURY)

MB	HG	MB	HG	MB	HG	MB	HG
925	27.32	962	28.41	991	29.26	1020	30.12
930	27.46	963	28.44	992	29.29	1021	30.15
935	27.61	964	28.47	993	29.32	1022	30.18
936	27.64	965	28.50	994	29.35	1023	30.21
937	27.67	966	28.53	995	29.38	1024	30.24
938	27.70	967	28.56	996	29.41	1025	30.27
939	27.73	968	28.58	997	29.44	1026	30.30
940	27.76	969	28.61	998	29.47	1027	30.33
941	27.79	970	28.64	999	29.50	1028	30.36
942	27.82	971	28.67	1000	29.53	1029	30.39
943	27.85	972	28.70	1001	29.56	1030	30.42
944	27.88	973	28.73	1002	29.59	1031	30.45
945	27.91	974	28.76	1003	29.62	1032	30.47
946	27.94	975	28.79	1004	29.65	1033	30.50
947	27.96	976	28.82	1005	29.68	1034	30.53
948	27.99	977	28.85	1006	29.71	1035	30.56
949	28.02	978	28.88	1007	29.74	1036	30.59
950	28.05	979	28.91	1008	29.77	1037	30.62
951	28.08	980	28.94	1009	29.80	1038	30.65
952	28.11	981	28.97	1010	29.83	1039	30.68
953	28.14	982	29.00	1011	29.85	1040	30.71
954	28.17	983	29.03	1012	29.88	1041	30.74
955	28.20	984	29.06	1013	29.91	1042	30.77
956	28.23	985	29.09	1014	29.94	1043	30.80
957	28.26	986	29.12	1015	29.97	1044	30.83
958	28.29	987	29.15	1016	30.00	1045	30.86
959	28.32	988	29.18	1017	30.03	1050	31.01
960	28.35	989	29.21	1018	30.06	1055	31.15
961	28.38	990	29.23	1019	30.09	1060	31.30

How has this winter turned out

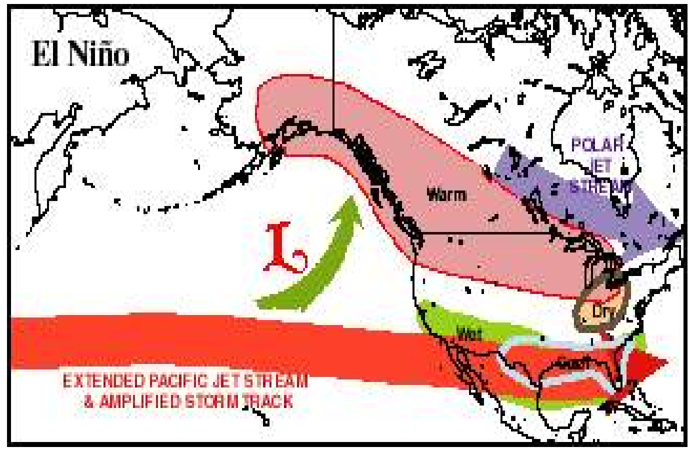
by Linnae Neyman

I moved here from the Nevada desert only last November and Southeast Alaska sure seemed wet to me! Looking at this winter so far, it has been wetter than normal, but mostly I heard everyone exclaiming over the unusual warmth (and a general bemoaning of our lack of snow).

Last fall we researched various climate predictors (including the official projections from the Climate Prediction Center http://www.cpc.ncep.noaa.gov) to formulate our winter outlook. We decided that this winter in Southeast Alaska looked as if it would be warmer and wetter than normal, but with less than normal snow. After checking the data for several weather stations through mid February...our winter outlook has worked out very well (much to the chagrin of the snow storm/winter sports enthusiasts on our staff!) The chart on page 8 helps illustrate how mild this winter has been thus far across the Panhandle.

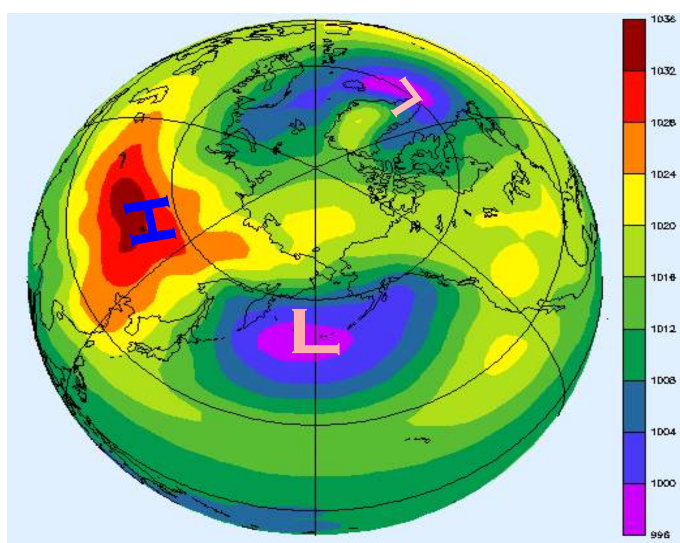
Though our climate research is still considered to be in its infancy, some interesting statistical correlations have been discovered. At the Juneau airport for example, the majority of winters (November through March) that were in the top 20 warmest on record were also in the top 20 winters with the least snow. The converse also seems to be true, many of the coldest winters also were among the snowiest! That's a pretty simplistic way to think about our winters in Southeast Alaska, but one that has worked out well so far this winter. More research is needed to understand why these types of statistical correlations exist, but part of the story can be related to the El Nino phenomenon. Other phenomena that likely play a role in the climate of Southeast Alaska (but that have not yet been researched as throughly as El Nino) include the Alaskan ocean current, extent of sea ice in the Bering and Arctic Ocean, and the Pacific Decadal Oscillation.

El Nino conditions over the past 25 years have resulted in warmer than normal winters in Southeast Alaska. As explained above, warmer winters here also tend to result in below normal winter snowfall. So what kind of weather pattern typically occurs during El Nino winters? The following graphic tries to depict these "typical" conditions. Of course, as most folks already know, there is an El Nino this winter in the Pacific ocean near the equator. It has been shown that during El Nino winters, the Aleutian Low is stronger than normal. This serves to send more than the normal amount of warm and moist maritime weather systems into Southeast Alaska.



A representation of typical conditions during an El Nino winter. The stronger than normal Aleutian Low in the North Pacific results in a more persistent southerly flow. This tends to keep the Southeast Alaska warmer and wetter than normal.

So what should we expect this spring? El Nino is now mature and will gradually weaken by summer. The Climate Prediction Center is predicting warmer than normal conditions to continue in the Panhandle through May. Precipitation is expected to be near normal this Spring. Remember that spring is historically our driest time of year in Southeast Alaska! d



The Aleutian Low (depicted above) is simply a region of average low sea level pressure in the Northern Hemisphere. This region is important to Southeast Alaska because it is the "birthplace" of most of our storms.

How this 'winter' (*November 1, 2002 -February 17, 2003*) ranks (*so far*) in Southeast Alaska weather record history				
Southeast Alaska Town:	This winter when compared to the historical average winter temperature:	Where this winter ranks among the **warmest** on record for each town:	This winter when compared to the historical average winter snowfall:	Where this winter ranks among the **least snowiest** on record:
Juneau	6°F warmer	3rd warmest	36" less snow	11th least snow
Yakutat	6°F warmer	3rd warmest	103" less snow	**lowest snow on record**
Skagway	8°F warmer	2nd warmest	14" less snow	7th least snow
Haines	5°F warmer	2nd warmest	79" less snow	**lowest snow on record**
Sitka	6°F warmer	**warmest on record**	24" less snow	2nd least snow
Ketchikan	4°F warmer	7th warmest	33" less snow	2nd least snow
Annette	7°F warmer	**warmest on record**	34" less snow	**lowest snow on record**
Petersburg	5°F warmer	3rd warmest	64" less snow	2nd least snow

Notes on this table: Records were compiled up to press time for this article (February 17, 2003) and compared to the historical weather record for each weather station. The Juneau airport, for example, has been 6°F warmer on average this winter than the historical average temperature for the same time period (November 1- February 17). In that weather record dating back to 1943, this winter had been the 3rd warmest on record. As of February 17, Juneau had received 36" less snow than the historical average. That meant this winter had been the 11th least snowiest on record. Please follow similar logic for interpreting the results for the other communities. These results will be recompiled at the end of March to see how the *entire* winter compared to the historical weather record for Southeast Alaska.

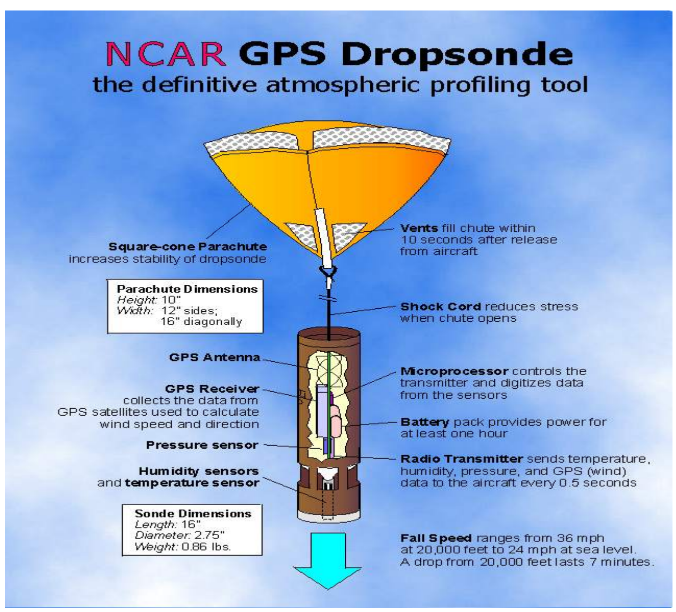
Winter Storm Reconnaissance

by Carl Dierking

Did you know that for the third winter in row something special happened in the skies over the North Pacific? Between January 18 and March 13 the National Weather Service sent specially equipt research aircraft to fly over storms in the North Pacific to retrieve additional data. The experience of previous years has shown that the addition of these "targeted" observations significantly improved the late winter weather forecasts, not only for the west coast, but for the entire country. The goal this year was to reduce uncertainty in 24-96 hour forecasts for specific weather events associated with potentially large impacts over the continental US and Alaska.

The Winter Storm Reconnaissance 2003 program (WSR03) had planned for approximately 150 flight hours (18-20 missions) with a NOAA G-lV plane through March 13th, with an additional 200 flight hours from 2 USAF C130 planes through February 14, 2003. The USAF C130 planes were based in Anchorage, while the NOAA G-lV was based in Honolulu. The planes will take "dropsonde" observations in areas that have been identified as the most relevant for improving the forecasts for events requested by weather forecasters in the field.

A "dropsonde" is an instrument attached to a parachute that measures temperature, humidity and wind as it falls down to the earth's surface. These measurements are transmitted back to the aircraft and then forwarded on to Washington, D.C. where the data is processed and used in the latest weather forecast models. Although it is too early to evaluate the total impact, expectations are high that these additional observations will result in improved weather forecasts. d



Southeast Alaska Winter Weather Trivia...

1. What is the *snowiest weather station* in Southeast Alaska (SEAK)?
2. What SEAK town experienced a record *19 consecutive days with at least 1" or more of snow* in 1959?
3. What is the *most snow ever to fall in March* at the Juneau Airport? How about in Ketchikan?
4. What town experienced the *snowiest day ever* in Southeast Alaska?
5. Back in 1937-38, what SEAK town set a record by going *more than a year without measurable snow*?
6. What is the *coldest temperature ever recorded* in Southeast Alaska?
7. How about the *warmest winter* (December-March) temperature *ever recorded* in Southeast Alaska?
8. What town endured a record *53 consecutive days of freezing temperatures* back in the winter of 49-50?

BONUS: Rank (*from greatest snow #1 to least #8*) the following locations by average winter snowfall!

Ketchikan___ Skagway___ Petersburg___ Juneau___ Yakutat___ Sitka___ Annette Island___ Haines___

WEATHER WATCHERS

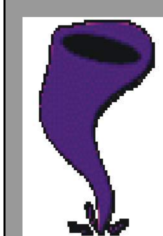
Southeast Alaska's Spotter Network

Our Most Active Spotter!

Winter is our severe weather season in Southeast Alaska. Our strongest storms almost always track through from October through March. These storms can generate high winds and heavy snow...our two most common types of severe weather. Without your reports, all kinds of impacts from these storms would be missed. The National Weather Service forecast staff here in Juneau really appreciates your time and dedication as weather spotters. Let's face it, without your help our forecasts and warnings would suffer! Because your work means so much to us, each quarter we recognize our most active spotter with a special prize or award.

This quarter our most active spotter was **John Markle of Saxman** with a total of 16 reports! Mr. Markle conveyed invaluable weather information during the January 5th hurricane force wind storm in Ketchikan! Mr. Markle will receive the 2003 version of the Alaska Weather Calendar. He will also be receiving copies of our updated Mariner's Weather Guide Brochure, our brand new Southeast Alaska Summer Climate Brochure and NOAA's Guide to Sea State, Wind and Clouds! John, Thanks for your service as one of Southeast Alaska's best Weather

Do you know someone interested in weather that is not a ***Weather Watcher?*** Let them know that becoming a weather spotter in Southeast Alaska is easy! You can browse through the training information on the web, we can mail you a course packet, or you can attend a short 2-hour spotter course. Courses may be scheduled in any community where there is enough interest to satisfy a minimal level of attendance (usually at least 10 people).



If you are interested in becoming a spotter or have some thoughts on how to improve our Weather Watchers Program, please give us a call at (907) 790-6803 or e-mail **chris.maier@noaa.gov** You will also find more information on our Spotter internet web page:

Trivia Answers: ***(1)*** *The Pleasant Camp Customs Station on the Haines Highway with a yearly average of 250" of snow! The Annex Creek Powerplant (Taku Inlet) is second with an annual average of 244" of snow.* ***(2)*** *Yakutat had 1" or more of snow each day from 2/26-3/16 in 1959. A total of 96" of snow fell during that stretch!* ***(3)*** *The Juneau International Airport received 53" of snow in March of 1948...31" occurred on March 21, another Juneau record! The Ketchikan record is 33" in March of 1971.* ***(4)*** *Haines with a whopping 38" of snow on February 1, 1991!* ***(5)*** *Skagway, believe it or not! No measurable snow fell from 11/29/37 through 12/29/38...a record of 455 consecutive days!* ***(6)*** *-28°F at the Canyon Island (Taku River near Canadian border) weather station on January 29,1996!* ***(7)*** *A balmy 69°F in Ketchikan on March 28, 1915!* ***(8)*** *Juneau endured 53 straight days where the high temperature was 32°F or colder from 12/21/49-2/12/50. The coldest temperature recorded at the airport during that time was -21°F on New Year's Eve!* ***(Bonus)*** *1...Yakutat 199" 2...Haines 171" 3...Petersburg airport 114" 4...Juneau airport 96" 5...Annette Island 50" 6...Ketchikan airport 43" 7...Sitka airport 39" 8...Skagway 37"*